PLEASE READ BEFORE USE

If you are planning on using a HELMER Model PF48 or PF96 inside this incubator and the first digit of the serial number of the PF48 or PF96 is "4" or greater than you may use the enclosed supplemental parts found in the shipping container to add an additional drawer to the top of the flatbed agitator. Follow the instructions located on the template in the rear pocket of this manual. If your agitator is not as noted above keep the extra parts as spares.

==========

For units sold in the United States only:

If you wish to place a platelet rotator (not a flatbed) into this incubator, which requires the rotator to be pulled out on a drawer for access, order the following supplemental part (if you have not done so already):

Model	Part Number	Description
PC900	400171	Drawer Assembly - PC900
PC1200	400204	Drawer Assembly - PC1200

Contents

(PC900 and PC1200)

Version G

1. Installation

2. Controls and Components

3. Operating Instructions

- A. Description of Digital Controller Parts
- B. Controller Program - Functions and Values
- C. Setting the Chamber Temperature
- D. Setting the Alarm
- E. Setting the "Lockout" Function
- F. Alarm Timer Adjustments
- G. Power Failure Alarm
- H. Installation of Platelet Agitator

4. Quality Control

- A. Calibration of the Digital Controller
- B. Calibration of the Chart Recorder
- C. Alarm System Test

5. Central Alarm Hook-up

6. Cleaning

7. Periodic Maintenance

8. Parts List

9. Refrigeration Recharging Chart

10. Wiring Schematic

11. Troubleshooting

- A. Electrical
- B. Alarms and Controller
- C. Chart Recorder
- D. Chamber Temperature
- E. Other

Installation

1) Carefully unpackage your new Helmer Platelet Incubator.
2) Select a permanent location keeping the following points in mind:

1. Allow at least 3 inches of air space at the back of the unit for adequate air circulation - do not push the unit tight against a back wall.

2. There must be a grounded outlet with adequate power specifications as listed on the specifications label on the back of the unit.

3. Keep away from direct sunlight or high temperature areas.

3) Turn the power switch to "I" (on) and allow the chamber temperature to stabilize (30 minutes) at the factory preset controller values. While waiting for the chamber temperature to stabilize, carefully continue reading through the instruction manual.

All functions in the controller system have been "locked out" at the time of shipment. The settings cannot be altered without proper understanding of the unit and controller.

The section entitled "Setting the Lockout Function" describes how to change the lockout feature to make any controller value changes. Before doing so, it is imperative to first understand how the unit operates.

The closing of the chamber door is controlled by a gas cylinder. DO NOT force the door to close faster than it does by itself. Doing so could damage the cylinder.

Controls and Components

Control Panel: The main control panel is conveniently located in the upper right hand corner of the unit and contains the main power switch, alarm, power failure alarm switch and digital controller. Note: The power failure alarm switch is activated with a key. On the PC900 it is located on the right wall. On the PC1200 it is located on the left side of the contol panel components.

Main Power Switch: The main power switch is located on the control panel and controls all electrical current to the unit. When the switched is turned to "I" (on) the fan, refrigeration, heating and electrical systems all become operative. All unit functions are shut down when the main power switch is turned to "O" (off).

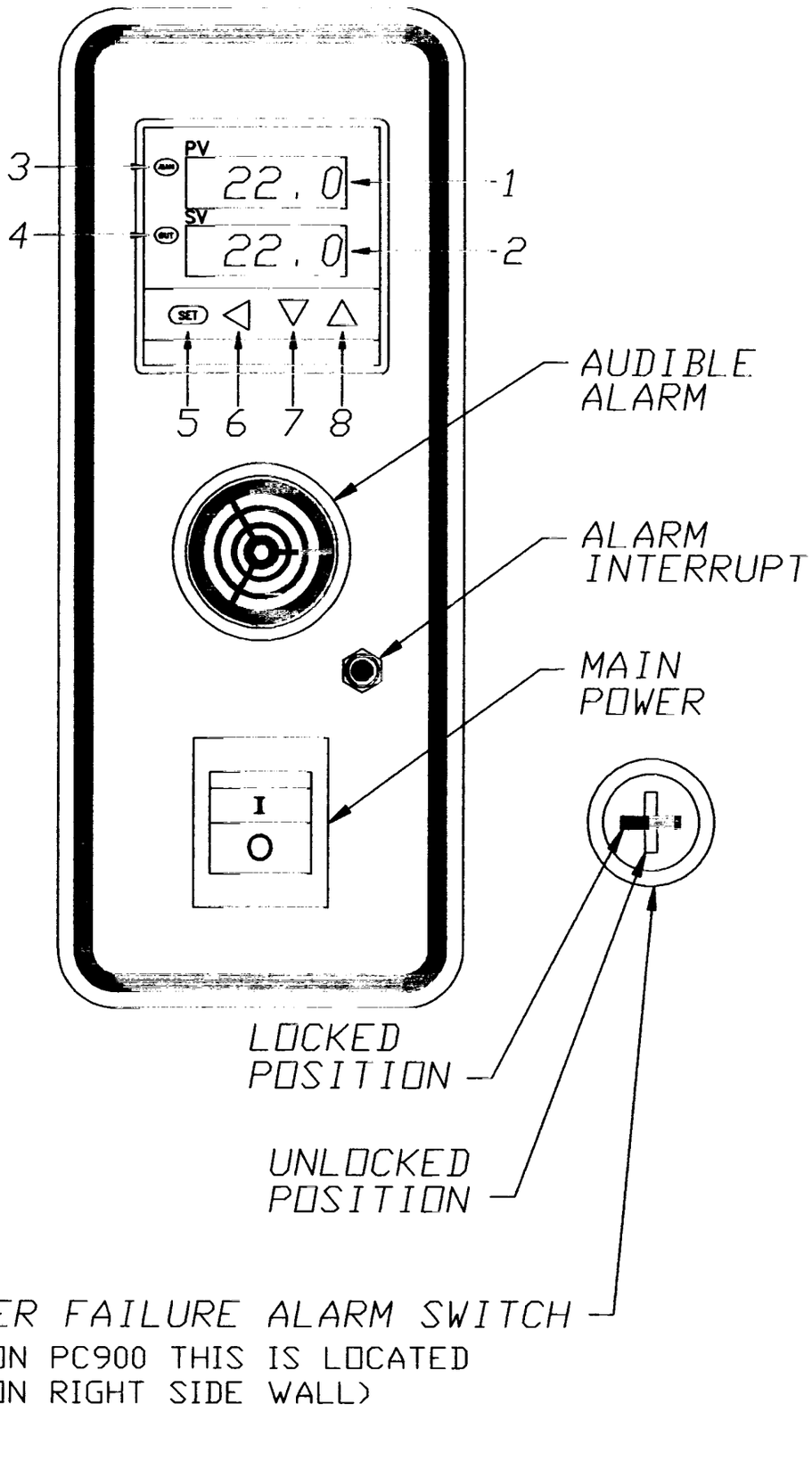
Digital Controller: Your Helmer Platelet Incubator incorporates a state-of-the-art PID digital controller system located on the control panel. The controller system provides visual readouts and controlling of the chamber temperature, alarms and other pertinent functions. All settings and calibration inputs are made through the controller touch keys.
Chart Recorder: The inkless 7-day temperature recorder monitors the chamber temperature independent of the controller system.

Refrigeration and Heating System: Cooling of the chamber is accomplished through a refrigeration system in which the compressor unit runs continuously. Heaters are directed to turn on by the controller system to maintain the set temperature.

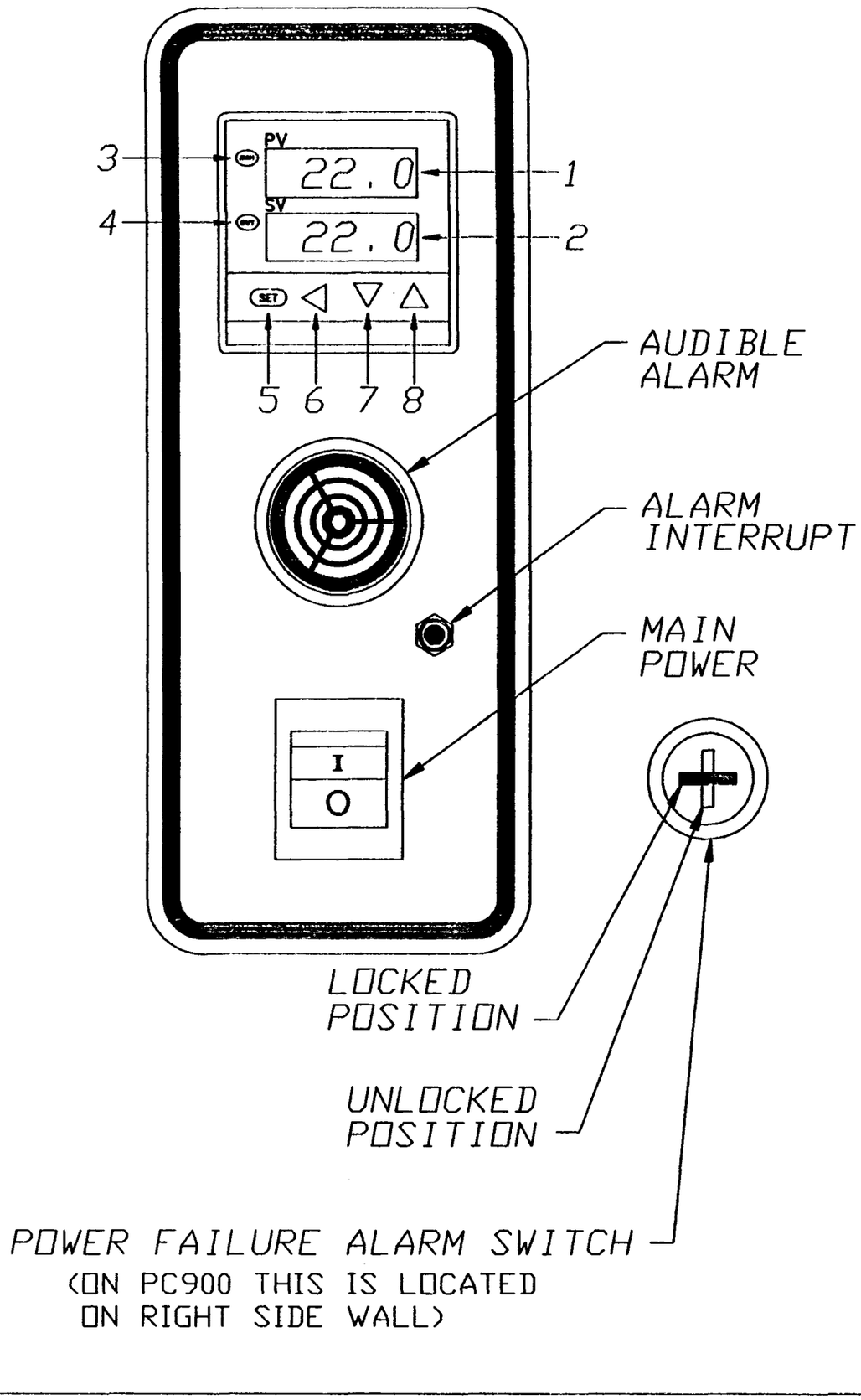
Chamber Fan: Air circulation is maintained within the chamber by a fan located in the back of the chamber. The fan operates continuously and is off only when the main power switch is turned off.

Specifications:

Weight: PC900 - 150 lbs., PC1200 - 195 lbs.
For 115 Volt Units; Amps - 9.0; Watts - 1035
For 230 Volt Units; Amps - 4.5; Watts - 1035


PV
22.0
SV
22.0
SET
3
4
1
2
5 6 7 8
AUDIBLE ALARM
ALARM INTERRUPT
MAIN POWER
I
O
LOCKED POSITION
UNLOCKED POSITION
POWER FAILURE ALARM SWITCH
(ON PC900 THIS IS LOCATED ON RIGHT SIDE WALL)

FRCNTRL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I
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LOCKED POSITION
UNLOCKED POSITION
POWER FAILURE ALARM SWITCH
(ON PC900 THIS IS LOCATED ON RIGHT SIDE WALL)

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Operating Instructions

A. Description of Digital Controller Parts

(1) Chamber Temperature Present Value - This green readout provides the actual temperature reading that the controller is sensing within the chamber in degrees C. There will be fluctations in this readout value as it is sensing momentary chamber temperatures.

(2) Chamber Temperature Set Value - This orange readout is the set temperature value. This value does not change during normal operation unless changed by the user. It is simply a continuous display of the desired set temperature.

(3) Alarm Indicator - If the unit goes into the alarm mode this red lamp will light as a visual indicator. This indicator light turns on immediately when the controller has sensed that the chamber temperature has gone beyond the deviation alarm set values. The audible alarm will delay alarming for a period of time set by the alarm timer adjustment on the circuit board after the controller has sensed an alarm condition. The built-in audible alarm delay prevents unnecessary warnings that may be caused by temporary temperature fluctuations.

The small, push-button switch located next to the audible alarm is the alarm interrupt switch. If you wish to silence your audible alarm, yet do not want to turn it off, push this switch. It will reset the time and start the delay period over.

(4) Heater on Indicator - This green indicator lamp turns on when the controller is providing output to the heater. It will turn on and off often for short periods of time during normal operation.

(5) Set Key - Used for entering into the various programming modes.

(6) Digit Shift Key (<) - Used to shift to the various digit placings.

(7) Set-Value Decrement Key - Used to reduce the digit values.

(8) Set-Value Increment Key - Used to increase the digit values.

B. Controller Program Functions and Values

The PID digital controller contains internal programs that effect the operation and accuracy of the controller and alarm system. There are some internal program functions that may be altered by the operator for specific requirements (alarm settings, security lockout and calibration). The remaining program functions must not be altered. The following is a summary of the internal program functions with their proper value settings:

Controller Program Name	Instructions to Enter the Program	Function Display Readout	Function Value
1. Temperature Selection	press SET key	SV blinks	* 022.0
2. First Program Mode	press SET key for 5 seconds	AL	* 002.0
		ATU	0000
		P	(value varies)
		I	(value varies)
		D	(value varies)
		Ar	0100
		T	0001
		LCY	* 0101
3. Second Program Mode	press SET key and Digit Shift Key for 5 seconds	SL1	0101
		SL2	0000
		SL3	1000
		SL4	1010
		SL5	0000
		SL6	0001
		SL7	0010
		SL8	0000
		Pb	* value varies
		oH	000.2
		AH	000.1
		SLH	040.0
		SLL	015.0

* - These values may be altered by the operator. All other values must not be changed.

Once again, only the:

"SV" (set chamber temperature value)
"AL" (deviation alarm value)
"LCY" (security lockout)
"Pb" (controller calibration)

function values may be altered by the operator, all other function values must remain as set by the factory. The above values have been listed as a reference guide as to the proper function value settings. If you have any questions on the function values please call a Helmer customer service representative.

C. Setting the Chamber Temperature

To alter the chamber temperature set value (controller part #2), press the SET key (5). The least significant orange indicator digit will be bright and the other digits will be fluttering **(the digit values cannot be changed if the controller is locked out - refer to section E, Setting the "Lockout" Function).** The bright digit may be changed by pressing on the up (8) and down (7) keys. To alter to the other digits, press the digit shift key (6) and then press the up and down keys as needed to change the value. After finishing the desired setting, press the SET key. All of the set-value digits light brightly and the controller returns to the display mode. The controller will now proceed in bringing the chamber temperature to the new set value temperature.

D. Setting the Alarm

The alarm used in this system is called a "deviation alarm." A deviation alarm is a plus/minus setting based off of the set temperature value (SV). The factory setting for the alarm deviation is 2.0 degrees C. Thus, with the set temperature value at 22.0, the controller would go into the alarm mode if the chamber temperature rose to 24.0 (+2.0 degrees) or declined to 20.0 (-2.0 degrees).

alarm on)_____< >_____(alarm on
-value set point +value

The digit values cannot be changed if the controller is locked out - refer to section E, Setting the "Lockout" Function. To change the deviation alarm value press and hold the SET key for 5 seconds until the controller displays the first program mode (The first setting is "AL" in the first program mode - refer to the Controller Program Values, section B). The green display will read "AL" which is the deviation alarm function and the orange display will show the deviation alarm value with the least significant digit brightly lit. Using the arrow keys change the value to the desired setting. To save the new input value into memory press the SET key once, otherwise the new input value will not be stored in memory. To exit, hold the SET key for 5 seconds until the normal operating mode appears.

E. Setting the "Lockout" Function

The controller has been set in the full "lockout" mode at the factory. This means that the setting values cannot be changed until the "lockout" value is changed. This security feature allows you to protect various input values from any unauthorized changes.

To change the lockout function, press and hold the SET key for 5 seconds to get into the first program mode. There are many program functions within the first program (refer to section B, Controller Functions and Values). Pressing once on the SET key will advance you to the various functions within the program. Continue pressing the SET key until the "LCY" (lockout) function appears. The various "LCY" input values with descriptions that may be used are as follows:

Input Value	Description
0000	None of the input data is locked and all controller values can be freely changed at any time.
0101	All of the input data is locked and cannot be changed without resetting this function (this is the input value set at the factory).
0110	Only the chamber temperature set value (SV) can be changed.

If you are desiring to change the chamber temperature set value (SV), alarm value (AL) or controller calibration value (Pb), the LCY function needs to read 0000 (or 0110 to change only the set value). This will allow you to change any of the function values. After making any changes it is important to reset the LCY function to the desired value. To return to the normal operating mode, press the SET key once to save any changed values into memory and then hold the SET key for 5 seconds.

Do not change any other functions in the parameter mode except for the "AL" and "LCY" functions. Alteration of remaining functions will affect operation and accuracy.

F. Alarm Timer Adjustments

The temperature alarm has a variable delay setting which can be changed to set the length of time desired before triggering the audible and central alarm relays. The time can be set from approximately 0 to 8 minutes. The adjustment is made with a dial located on the internal circuit board. Turning the dial to its extreme clockwise position sets the delay time to 8 minutes. Turning the dial to its extreme counter-clockwise position sets the delay time to 0 minutes. See the schematic for the "Alarm Timer Adjustment" location and access to this dial. Also, the alarm delay can be disabled to give instantaneous response by moving the "Alarm Disable" jumper on the same circuit board to the "O" position.

G. Power Failure Alarm

The same circuit board mentioned above also has a line-connected rechargeable battery which powers a power failure alarm. In the event of a power interruption caused by a power outage, an unplugged cord, a tripped circuit breaker or a blown fuse the audible alarm will sound and the central alarm relay will trigger. To disable this alarm use the keylock switch located on the front control panel of the unit. Disabling the power failure alarm does not disable the temperature alarm. It is recommended to place the key for this switch in a location seperate from the switch.

H. Installation of Platelet Agitators

To install a platelet agitator, open the roll-top door and carefully place the platelet agitator into the center of the incubator chamber. Plug the platelet agitator power cord into the outlet located on the back wall of the chamber. Make sure that the power cord is properly secured to prevent cord damage when the drawers are rolled in and out. Turn the platelet agitator power switch "On" and verify that it is centered within the chamber.

Quality Control

A. Calibration of Digital Controller

To verify that the digital controller is calibrated correctly, first place an a calibrated mercury thermometer inside of the incubator chamber. Allow the chamber temperature to stabilize for 30 minutes and then take a reading from the thermometer. If the thermometer reads the same as the green PV display then the controller is calibrated correctly. If there is a variance in the temperature readings then the digital controller display needs to be calibrated. The operating temperature and alarm settings should operate within a +/- 1.0 degrees C of the set values.

To recalibrate the PV value first set the "LCY" (lockout) function to 0000. Press the SET key once to store the new 0000 value into memory. Next, press and hold the SET key and the Digit Shift Key (<) until "SL1" appears in the green display. Press the SET key to move through the various functions (refer to Controller Program Functions and Values section of this manual) until you get to the "Pb" function. The "Pb" funciton is the calibration function that allows you to alter the green display reading to the proper set temperature.

As an example, if the thermometer reads 21.5 when the controller reads 22.0 then the controller display needs to be reduced by 0.5 of a degree. Using the touch key arrows reduce the "Pb" value by 0.5 of a degree. If the thermometer reads 22.5 when the display reads 22.0 then increase the "Pb" value by 0.5 of a degree.

After the desired change has been made press the SET key once to hold the new input value into memeory. Then return to the operating display by holding both the SET key and the Digital Shift Key (<) until the temperature display re-appears.

Allow 30 minutes for the chamber temperature to stabilize and make a new reading to verify that the controller is giving the proper temperature readout. Make any additional adjustments as needed until the controller readout is properly calibrated.

B. Calibration of the Chart Recorder

Allow the chamber temperature to stabilize at 22.0 degrees (30 minutes). Then observe what temperature the chart recorder is indicating. If the chart recorder is marking at 22.0 degrees then the chart recorder is properly calibrated. If the chart recorder is not marking at 22.0 degrees then the marking stylus needs to be adjusted.

To adjust the marking stylus loosen the small screw at the top of the stylus. Set the stylus point at 22.0 degrees and tighten the screw down. The chart recorder stylus should now mark at 22.0 degrees.

C. Alarm System Tests

To test that the deviation alarm system is working properly, it is recommended to follow methods that may be recommended by the AABB or governing organizations for such alarm system checks. Two ways of conducting a deviation alarm system test are as follows:

Method 1: This first alarm system check method requires only a short period of time to conduct. Note that this first method does not test the high and low temperature limits. This method simply verifies that the general alarm system is working properly.

Refering back to a previous section on "Setting the Alarm," go into the first program mode and set the "AL" function value to "000.0" degrees. Next, press the SET key once to advance to the next function (ATU). The alarm indicator light should turn on saying that the controller is in the alarm mode. The audible alarm will not sound for about 10 minutes as a result of the built-in alarm delay system. Remember to reset the "AL" function to the desired value when finished with this test.

Method 2: This second method will test the high and low alarm points without altering the actual chamber temperature. The controller thermocouple is located within the chamber on the bottom portion of the back wall. Turn the platelet agitator power switch to off. Remove the cover channel mounted on the side wall by pulling it forward. Pull the thermocouple out of the holding clip and extend the thermocouple out to the front of the unit. Close the incubator door. With the thermocouple located outside of the incubator, place it into a container with cool water -- the water should be just slightly cooler than the low alarm activation point. Watch for the alarm indicator light to come on. When the alarm light illuminates, take a reading of the controller temperature readout (PV). **Do not wait for the audible alarm to sound. It will delay alarming for a period of time set by the alarm timer adjustment on the circuit board. This will take place after the controller has sensed an alarm condition.** To test the high alarm activation point place warmer water in the container (slightly warmer than the high alarm activation point) and make a reading when the alarm indicator light comes on. After testing, place the thermocouple back in its holding clip and carefully place the excess thermocouple wire in the plastic holding channel to prevent any wire damage.

Note: The controller probe and chart recorder probe are separate probes. this allows the controller to have an exceptionally quick response time which will give greater temperature uniformity. When this alarm test is done the chart recorder probe is still mounted in the chamber. this probe resopnds to temperature change at a mauch slower rate than the controller probe. Therefore, it would not reflect the correct solution temperature properly at the moment of alarm. Do not leave the controller probe in your test solution for a long period of time. The controller will compensate for what it thinks is a change in chamber temperature by increasing or decreasing the amount of heat to the system.

Central Alarm Hook-up

To connect a central alarm system into the platelet incubator you will need to do the following:

1. Turn the power switch off and unplug the unit.
2. Remove the top exterior back panel.
3. Locate the three terminals on the right side of the secondary circuit board. These three outputs are for connecting to a central alarm system. The outside terminal (#16) is the common , the next terminal to the left (#15) is the normally closed contact and the second terminal to the left (#14) is the normally open contact.
4. Connect the central alarm wires to the proper terminals for your alarm system.
5. Cable tie the wires a necessary for stability.
6. Run the central alarm wires through the small grommet located in the back of the exterior panel that was removed.
7. Replace the panel into its correct position.

To connect a central alarm system to the agitator alarms in the platelet incubator see the agitator or motion alarm instructions. A hole is provided on the right side of the chamber wall for wire access to the chamber. Remove the plug on the exterior side of the wall for access.

Cleaning

The importance of proper cleaning of your Helmer Platelet Incubator cannot be under estimated. Lack of cleaning of items, such as the condensor fins, can significantly cut down on the life expectancy of this equipment.

Painted Exterior - A soft cotton cloth and non-abrasive liquid cleaner should be used for cleaning the exterior surfaces. The doors should be cleaned with a soft cotton cloth and window cleaner. The black condensor fins located on the upper left side in the rear of the unit should be cleaned and vacuumed often.

Roll-Top Door - The clear portion of the roll-top door is made of a ploycarbonate material which is very durable but does scratch easily. Therefore, great care must be taken when cleaning this part of the unit. Lightly wipe the door with a clean and very soft cotton cloth - do not push hard when cleaning and do not rub back and forth across the door. Lightly wipe in one direction. If a cleaner must be used to clean debris off of the door then spray some window cleaner onto the clean rag and then wipe - do not spray the cleaner directly onto the clear part of the roll-top door.

Interior - Always turn the power switch off when cleaning the interior of the incubator. A disinfectant cleaner should be used to wipe down the inside stainless steel walls, drawer and interior water drain tray on a regular basis.

Periodic Maintenance

It is recommended to conduct the following maintenance items to help keep your Helmer Platelet Incubator in good working condition:

Monthly:	1. Clean and vacuum condenser grill. 2. Clean interior chamber. 3. Conduct alarm and calibration checks.
Yearly:	1. Freon check - the compressor line valves are accessed by removing the top exterior back panel.

Parts List

(Model PC900 and PC1200)

To order parts for your Helmer Platelet Incubator, indicate the quantity, part number and description with your purchase order number. Please provide the model number and serial number as well.

Stock Number	Description
400211	Digital Controller
400247	Secondary Circuit Board
120160	Audible Alarm
120157	On/Off Power Switch - 120V
120158	On/Off Power Switch - 240V
120074	Chamber Electrical Outlet - 120V
120097	Chamber Electrical Outlet - 240V
400157	Chart Recorder Assembly - 120V
400158	Chart Recorder Assembly - 240V
120081	Chart Recorder Motor - 120V
120038	Chart Recorder Motor - 240V
220064	Chart Recorder Paper (50/box)
120170	Chamber Fan Motor - 120V
120171	Chamber Fan Motor - 240V
120055	Compressor (Tecumseh Brand) - 120V
120056	Compressor (Tecumseh Brand) - 240V
120180	Compressor (Copeland Brand) - 120V
120181	Compressor (Copeland Brand) - 240V
400172	Chamber Cover Assembly (PC900)
400173	Chamber Cover Assembly (PC1200)
120198	Fuse, 6.3 Amp - 240V
120220	Circuit Breaker, Amp - 120V
120197	Alarm Delay Switch
120227	Power Failure Alarm Switch

Refrigeration Recharging Chart

Approximate recharging weight is as follows:
PC900 & PC1200 - 5 oz. (Note: Refrigerant is R12)

After recharging follow the procedure below:

Allow the incubator chamber temperature to stabilize at 22.0 degrees C. With a pressure gauge set on the refrigeration lines the refrigerant pressure should be as follows:

Room Temperature		Low Side (suction) Pressure
C	F	PSI
18	64.4	29.0
19	66.2	29.5
20	68.0	30.0
21	69.8	30.5
22	71.6	31.0
23	73.4	31.5
24	75.2	32.0
25	77.0	32.6
26	78.8	33.3
27	80.6	33.5
28	82.4	34.3
29	84.2	34.8
30	86.0	35.4

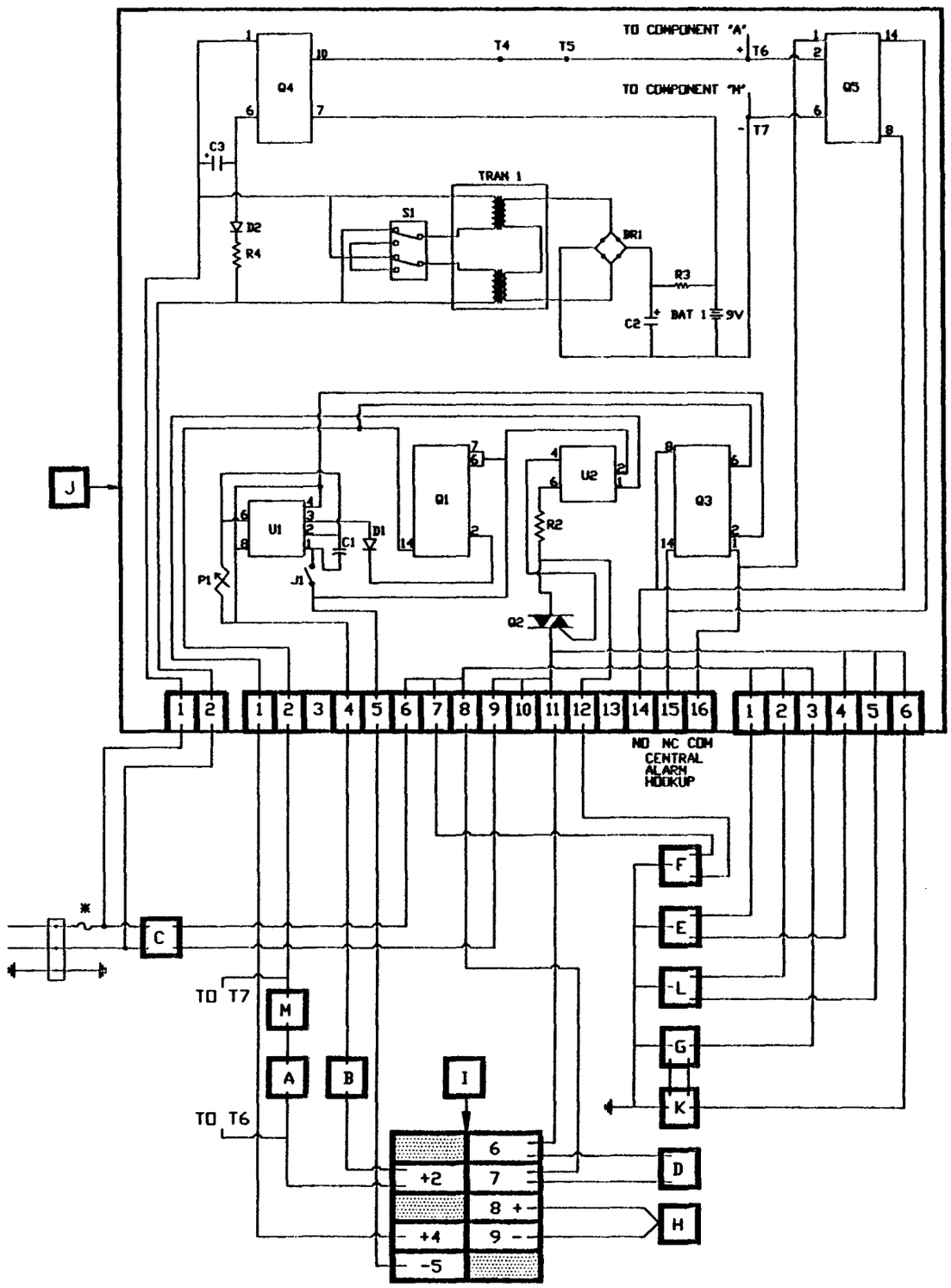
A flourescent additive has been added to the refrigeration system. Leaks may be diagnosed with the aid of an ultraviolet light. Shine the light on joints where leaks may be occuring. A leak is identified by a bright film residing at the site of the leak.

ECO	REV	DATE	REVISION DESCRIPTION	BY	APV
0177	C	3-30-93	ADDED POWER FAILURE ALARM	YAV	DLH

PCFRSC_4

Wiring Schematic

(PC900 and P1200)



Incoming Power

* German units have both incoming power lines fused.

SEE TABLE ON PREVIOUS PAGE FOR DESCRIPTION OF COMPONENTS

Wiring Descriptions
PC900 & PC1200
(C100 Voltage Pulse)

Digital Controller Terminals

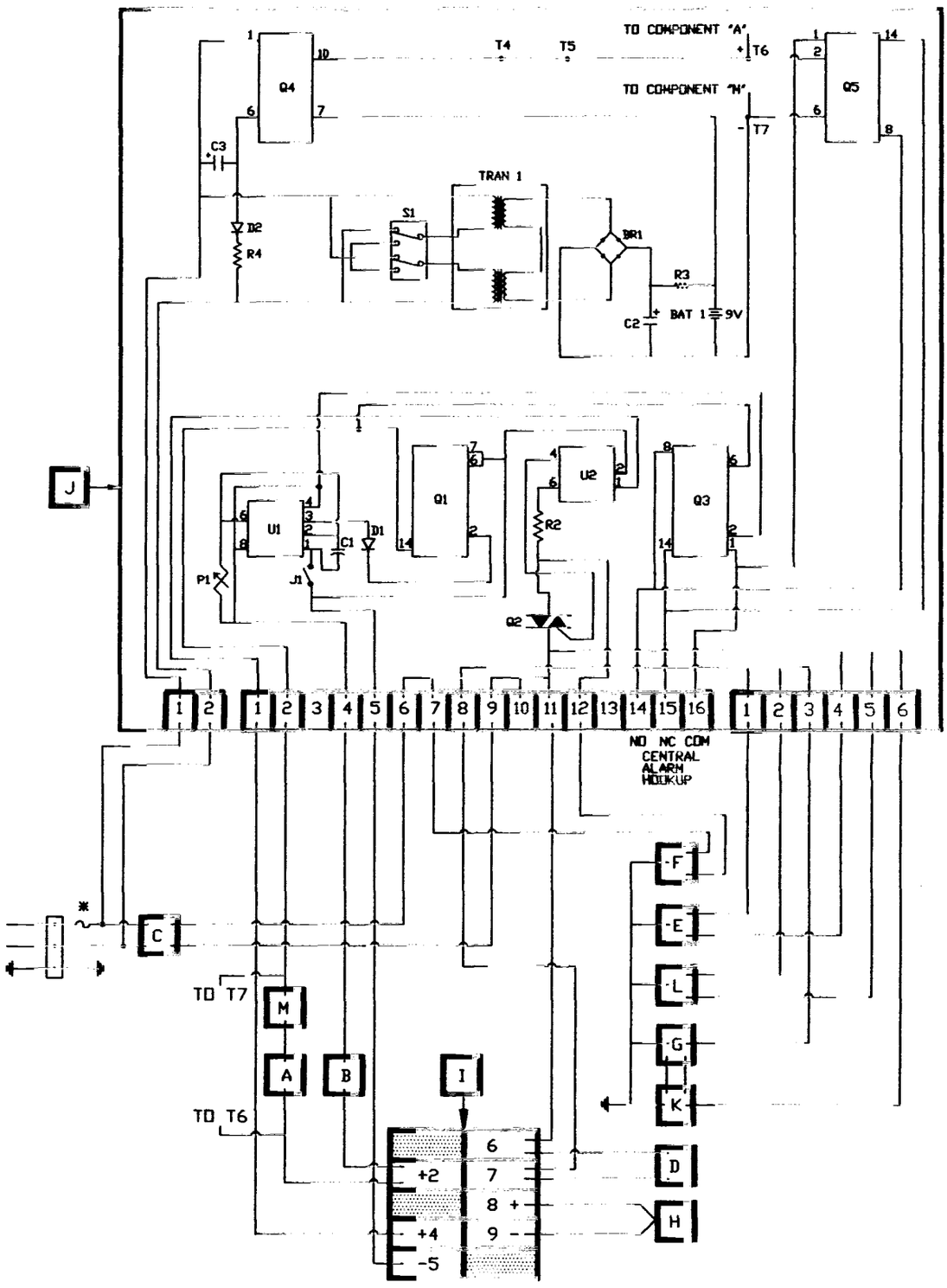
Terminal	Wire Color	Description
1	----	This terminal is not used.
2	red	Voltage output to secondary circuit board and audible alarm (12 volts (+) dc).
3	----	This terminal is not used.
4	orange	Voltage output to secondary circuit board for heater system (1.2 volts (+) dc).
5	blue	Voltage output to secondary circuit board for heater system (1.2 volts (-) dc).
6	white or blue	Incoming power supply from secondary circuit board and power to chart recorder.
7	black or brown	Incoming power supply from secondary circuit board and power to chart recorder.
8	blue	Type "T" thermocouple input(+)
9	red	Type "T" thermocouple input (-)

ECO	REV	DATE	REVISION DESCRIPTION	BY
0177	C	3-30-93	ADDED POWER FAILURE ALARM	TAV DLH

PCFRSC_4

Wiring Schematic

(PC900 and P1200)



Incoming Power

* German units have both incoming power lines fused.

SEE TABLE ON PREVIOUS PAGE FOR DESCRIPTION OF COMPONENTS

Secondary Circuit Board Terminals (PC900 and PC1200)

Terminal (T1)	Wire Color	Description
1	orange	Voltage input for heater system (1.2 volts (+) dc).
2	yellow	Voltage output to alarm (12 volts (-) dc).
3	---	This terminal is not used.
4	red	Voltage input for alarm delay system (12 volts (+) dc).
5	dark blue	Voltage input for heater system (1.2 volts (-) dc).
6	black or brown	Power input from switch.
7	black or brown	Power output to chamber heater.
8	black or brown	Power output to controller.
9	white or blue	Power input from switch.
10	---	This terminal is not used.
11	white or blue	Power output to controller.
12	black or red	Power output to chamber heater.
13	---	This terminal is not used.
14		Central Alarm (normally open).
15		Central Alarm (normally closed).
16		Central Alarm (common).

Terminal (T2)	Wire Color	Description
1	black or brown	Main power input to power failure alarm.
2	white or blue	Main power input to power failure alarm.

Terminal (T3)	Wire Color	Description
1	black or brown	Power output to chamber fan.
2	black or brown	Power output to chamber outlet.
3	black or brown	Power output to compressor unit.
4	white or blue	Power output to chamber fan.
5	white or blue	Power output to chamber outlet.
6	white or blue	Power output to compressor unit.

Component List for Schematic

Component	Location	Access
A - Audible alarm	Front control panel	Remove back panel
B - Alarm delay switch (NC)	Front control panel	Remove back panel
C - Main power switch	Front control panel	Remove back panel
D - Chart recorder	Top front panel	Open chart panel
E - Chamber fan	Inside chamber (back wall)	Remove chamber back wall
F - Chamber heater	Inside chamber (behind back wall)	Remove chamber back wall
G - Compressor	Top of unit	Remove top access panel
H - Thermocouple	Inside chamber (bottom of back wall)	Remove from clip
I - Temperature controller	Front control panel	Remove back panel
J - Secondary circuit board	Top of unit (inside)	Remove back panel
K - Condensor fan	Rear of unit (behind condensor grill)	Remove top access panel
L - Chamber outlet	Inside chamber (back wall)	Remove chamber back wall
M - Power failure alarm switch	Top front panel	Remove back panel

Components on secondary circuit board

P1 - Alarm Timer Adjustment	See secondary circuit board above
J1 - Alarm Disable	See secondary circuit board above

Troubleshooting

(PC900 and PC1200)

Electrical

Problem	Possible Cause	Action to be Taken
Unit does not turn on.	- Circuit breaker or fuse activated.	- Reset circuit breaker or replace fuse.
	- Faulty outlet connection.	- Verify outlet is good. Plug into a different outlet.
	- Faulty power cord.	- Verify proper cord connections. Change power cord.
	- Faulty power switch.	- Replace switch.
Controller does not turn on.	- Faulty connections.	- Verify connections from the power switch to the controller.
	- Faulty controller.	- Verify voltage to the controller. If receiving voltage and not operating, replace controller.
Platelet agitator not operating.	- Faulty platelet agitator.	- Verify that agitator is working properly.
	- Faulty power outlet.	- Verify voltage to outlet. If no voltage, check connections to and within the outlet.
Power cord on agitator rubbing.	- Agitator not centered in drawer.	- Verify positioning of agitator.
	- Power cord not mounted properly.	- Verify positioning of cord. Use clips on back wall to hold the power cord.
	- Agitator sliding in drawer.	- Clean any grease and debris in drawer. Verify agitator feet are in proper position and condition.
Chamber fan not operating.	- No power to fan.	- Verify power to the fans. If no voltage check connections.
	- Faulty fan.	- Replace fan.
Compressor not running	- Compressor not getting power.	- Visually verify that condensor fan is operating. If fan is operating see the next step. If not, check for faulty connection.
	- Compressor failure.	- Replace compressor.
	- Compressor in thermal shutdown.	- Verify that the compressor unit is getting proper air flow - at least 4 inches from any obstacles. Make sure the condensor grill is clean. Turn power off and allow compressor to cool down. Turn unit back on and verify whether compressor is operating. If not, possibly a faulty thermal switch on compressor or compressor has gone bad.

Other

Ice laying in water tray.	- Freon pressure is low.	- Verify freon presures. Add R-12 freon as needed.
Severe water puddling in water tray.	- Drain hole plugged.	- Unclog drain hole.
	- Door not closing tight, allowing humid air into the chamber.	- Verify that door gasket is sealing and door is closing properly.
Water is puddling outside of the incubator.	- Drain pan leaks.	- Seal any leaks in drain pan with silicone.
	- Water is condensing on evaporator lines to the compressor.	- Apply additional cork tape to copper lines.
	- Excessive humidity.	- Water will accumulate more during humid periods. Make sure door is closing properly.
Platelets are "pooling" to one side of the bag.	- Unit not level.	- Verify that the unit is sitting level. Verify that agitators are sitting level.
Agitator power cord in the way.	- Not mounted up properly.	- Use the cord hanger clips on the back wall to help hold the power cord - tie up if necessary. Make sure that it is clear of any obstructions during normal use.
Drawer does not slide easily.	- Debris in drawer slide.	- Pull drawer out and clean the slide channels.
	- Mounting screws loose.	- Verify drawer mounting screws are tight.
	- Faulty drawer slide.	- Replace drawer slide.
Door does not open and close easily.	- Debris in door pivot mount.	- Remove door and clean the pivot mounts.
	- Door closure not aligned. closure with the door.	- Verify proper positioning and alignment of
	- Faulty door closure.	- Replace door closure.

Chamber Temperature

Chamber temperature not cooling.	- Low freon pressure.	- Verify proper freon level in compressor unit.
	- Faulty compressor.	- Verify connections. Change compressor unit.
	- Faulty controller.	- If heater light is always illuminated even when even when PV value is above the SV value, controller is not operating correctly. Replace the controller.
	- Faulty secondary circuit board.	- Current should only be going to heater when controller heater light is on. If current is going to the heater all the time from the secondary circuit board (line 12) then change secondary circuit board.
	- Door not sealing tight.	- Verify that door is closing and sealing properly.
Chamber temperature running cold.	- Faulty controller.	- Verify that controller heater light is illuminating to operate heater. If not, change controller. Verify voltage (about 1.28 volts dc) coming into connections 1 and 5 on the secondary circuit board when the heater light is illuminated. If not, change controller.
	- Faulty secondary circuit board.	- Current should be coming out of line 12 on the secondary circuit board to the heater when the controller heater light is on. If not, change secondary circuit board. If yes, check connections to the heater.
	- Faulty heater.	- Replace heater.

Chart Recorder

Chart recorder paper not moving.	- Finger screw not tight onto paper.	- Verify that the finger screw is tight.
	- Hub attached to motor shaft is loose.	- Verify that the set screw on the hub which is attached to the drive motor shaft is tightened. The surface of the hub should be above the surface of the chart recorder
	- No power to the recorder.	- Open recorder door. Loosen the two thumb screws and open. Verify power to the terminal block.
	- Faulty chart drive motor.	- Verify that the motor is getting power. If not, check wiring connections. If so, replace the motor.
Chart recorder giving sporadic readings.	- Faulty chart recorder.	- Verify recorder readings with a mercury thermometer. If temperatures do not correlate, first verify that the recorder stylus screw is tight. If yes, replace chart recorder.
	- Chamber fan not circulating air properly.	- Verify proper fan operation.
	- Faulty heater.	- Verify power to heater. Change heater if heater is receiving power.
	- Faulty controller.	- Replace controller.
	- Faulty thermocouple sensor.	- Replace thermocouple.
	- Faulty secondary circuit board.	- Verify that current is going to the heater from line 12 of the secondary circuit board when the heater light illuminates on the controller. If not, replace this circuit board.
	- Faulty compressor unit.	- Verfiy connections. Change compressor unit.
	- Door not sealing tight. properly.	- Verify that the door is closing and sealing

Central alarm not operating.	- Faulty connections.	- Verify proper connections to incubator and within the central alarm system.
	- Alarm output relay is faulty.	- Verify that you have the proper relay for your central alarm system and that it is connected properly (refer to the section on central alarm hook-up). Verify that the relay is operating. If not, replace the faulty relay.
	-Faulty controller.	- Verify that the controller alarm system is operating correctly. If not, replace the controller.
	- Faulty secondary circuit board.	- Verify that there is voltage output to the alarm (12 volts (-) dc).If not, replace the secondary circuit board.

Alarms and Controller

Audible alarm not sounding.	- Not waiting for alarm delay to cycle.	- The alarm system has an approximate 8-10 minute delay system before the audible alarm will sound. Wait sufficient time for alarm delay to cycle.
	- Faulty controller.	- Refer to the Alarm System Test portion of this manual. If the alarm light on the controller is not illuminating, replace the controller. If the controller alarm light is operating, verify voltage to inputs 4 and 5 on the secondary circuit board (12 volts dc). If receiving voltage, proceed to next step.
	- Faulty secondary circuit board.	- After waiting for alarm delay period, if no voltage is going to the alarm (12 volts dc) then replace the secondary circuit board.
	- Faulty connections.	- Verify proper line connections.
	- Faulty alarm	- Replace alarm.
Alarm sounding sporadically.	- Faulty alarm system.	- Verify proper operation of the controller, secondary circuit board and line connections.
	- Alarm deviation value set too tight.	- During normal operation the temperature will fluctuate as a result of many factors. If the alarm value is set too tight to the SV value the alarm may sound often. Remember, the alarm system is to warn of serious unit temperature fluctations. Increase the alarm value.
	- Door not closing.	- Verify proper alignment of door closure.
	- Air gaps around door.	- Verify door gaskets are sealing properly.
	- Chamber temperature not stabilizing.	- Verify that the chamber temperature is maintaining a proper and consistent temperature. Refer to Qualtiy Control section.
Alarm not activating at proper temperature.	- Calibrate controller.	- Refer to section on Calibration of the Digital Controller.
Controller setting not calibrated properly.	- Calibrate controller.	- Refer to section on Calibration of the Digital Controller.